higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATERIALS
NQF LEVEL 4

(12010484)

1 March 2018 (Y-Paper)
13:00–16:00

This question paper consists of 7 pages

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TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. ALL drawings must be neat and well balanced.
5. ALL work you do not want to be marked must be clearly crossed out.
6. Write neatly and legibly.

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QUESTION 1: PLASTICS.

1.1 Choose an item from COLUMN B that matches a word in COLUMN A. Write only the letter (A–D) next to question number (1.1.1–1.1.4) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.1.1	Electrical insulation	A	polymethyl methacralate
1.1.2	Plumbing hardware, pipes, ropes	B	polyamides
1.1.3	Baths,showerdoors, skylights	C	polypropylene
1.1.4	Cable ties, screws, gears	D	polyethylene terephthalate

(4 × 1) (4)

1.2 The colour of plastic pipes usually indicates where it is used on a construction site.

Explain how you will distinguish between a pipe that will be used above the ground and one that will be used below ground level. (4)

1.3 List THREE precautions that you would take when wanting to solvent weld two 50 mm pipes together. (3)

1.4 Sometimes it is difficult to tell what type of plastic you are working with.

Explain with the help of a piece of copper wire and a gas torch, how you will determine whether a plastic is PVC or not. (6)

1.5 List THREE steps in the procedure for solvent welding of PVC waste pipe or conduit. (3)

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QUESTION 2: ELASTOMERS

2.1 Name any THREE properties of elastomers. (3)

2.2 Cured natural rubber is an elastomer and is used quite extensively on the construction site.

List FOUR areas on the construction site where rubber is used. (4)

2.3 Describe the difference between a silicone sealant and an acrylic sealant. (3)

[10]

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QUESTION 3: ADHESIVES

3.1 Choose an item from COLUMN B that matches a word in COLUMN A. Write only the letter (A–E) next to question number (3.1.1–3.1.5) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.1.1	Weak intermolecular forces that bond molecules together	A	an adhesive must be able to withstand shear, tensile and compressive forces
3.1.2	Strength of the adhesive	B	joints are directly proportionate to the glued area
3.1.3	You will only get good adhesion when the adhesive sinks into the pores in the substrates of the material	C	van der Waal's
3.1.4	Surface area of joints	D	mechanical interlock
3.1.5	The bond between smooth surfaces may not be as strong as the between rough surfaces	E	penetration into the substrates

(5 × 1) (5)

3.2 3.2.1 Explain the way in which hot melt adhesive is applied. (1)

3.2.2 Give ONE example of where hot melt adhesive is used. (1)

3.3 3.3.1 Two pieces of permeable and porous timber must be glued together.

Explain how you will complete the task. (4)

3.3.2 What kind of adhesive must be used for the task in QUESTION 3.3.1? (1)

3.4 When working with epoxies, you expose yourself to injury.

State THREE ways to avoid injury when handling epoxies. (3)

[15]

QUESTION 4: PAINTS, WATER REPELENTS, COATINGS AND PRESERVATIVES.

4.1 While using enamel paint, you accidently spilled some of the paint onto your skin and eye.

Explain what must be done to avoid any harm to your eye and skin. (2)

4.2 A garage gate made from mild steel must be repainted.

Explain a step by step preparation method you will apply to ensure that the new paint will adhere to the gate. (6)

4.3 The durability of a wooden structure depends on weathering, insect or fungal attacks, fire, chemical and mechanical degradation.

Explain how to minimise or combat the degradation of timber. (7)

4.4 Grit and shot blasting is especially effective in situations where chemicals cannot be used in preparing metal structures for painting, but is also very hazardous to those applying the process.

Name FOUR health hazards that workers are exposed to while applying the process. (5)

[20]

QUESTION 5: WATERPROOFING OF BUILDINGS, DAMP-PROOFING AND VAPOUR BARRIER INSTALLATION.

5.1 Name FIVE advantages an acrylic resin-based cementations system provides in permanent waterproofing. (5)

5.2 The National Building Regulation (SANS 10400) specifies that all roofs of buildings in South Africa must have a 1 : 80 fall. However in practice the recommended minimum slope should not be less than 1 : 50 or 1 : 14 degrees.

What is meant by this regulation? (3)

5.3 5.3.1 Why are weep holes left in cavity walls? (1)

5.3.2 Explain TWO consequences if weep holes are not properly cleaned or if they are blocked. (2)

5.4 Give FOUR reasons why organosilane/siloxane is a very popular water repellent in the building industry. (4)

[15]

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QUESTION 6: BITUMEN, TAR AND ASPHALT.

6.1 Give ONE application and ONE advantage of the following mixers of asphalt used in South Africa:

6.1.1 Continuously graded asphalt

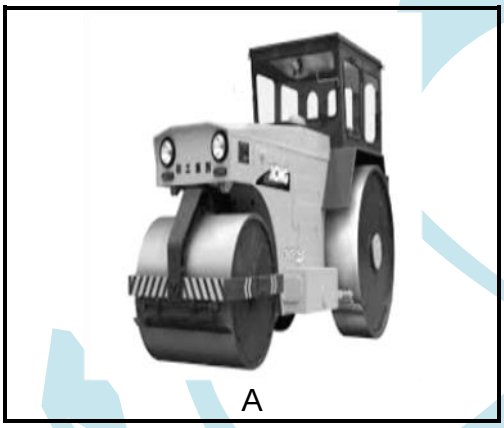
6.1.2 Gap graded asphalt

6.1.3 Open graded asphalt

(3 × 2) (6)

6.2 Identify the following road construction plant. Write only the letter (A–B) next to the question number (6.2.1–6.2.2) in the ANSWER BOOK.

6.2.1



A

6.2.2



B

(2 × 1) (2)

6.3 State TWO reasons why bitumen are modified. (2)

[10]

QUESTION 7: FASTENERS

7.1 Identify the following fasteners. Write only the name next to the question number (7.1.1–7.1.4) in the ANSWER BOOK.

7.1.1 7.1.2 7.1.3 7.1.4	A  B  C  D 

(4 × 1) (4)

7.2 The number on the head of a bolt is 3.8.

Calculate the following:

7.2.1 Nominal tensile strength

7.2.2 Nominal yield strength

(2 × 2) (4)

7.3 State TWO methods that can be used to control the preload that can be applied to bolts to avoid bolt shear. (2)

[10]

TOTAL: 100

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